phenoDist

Cell-based High-throughput Screening

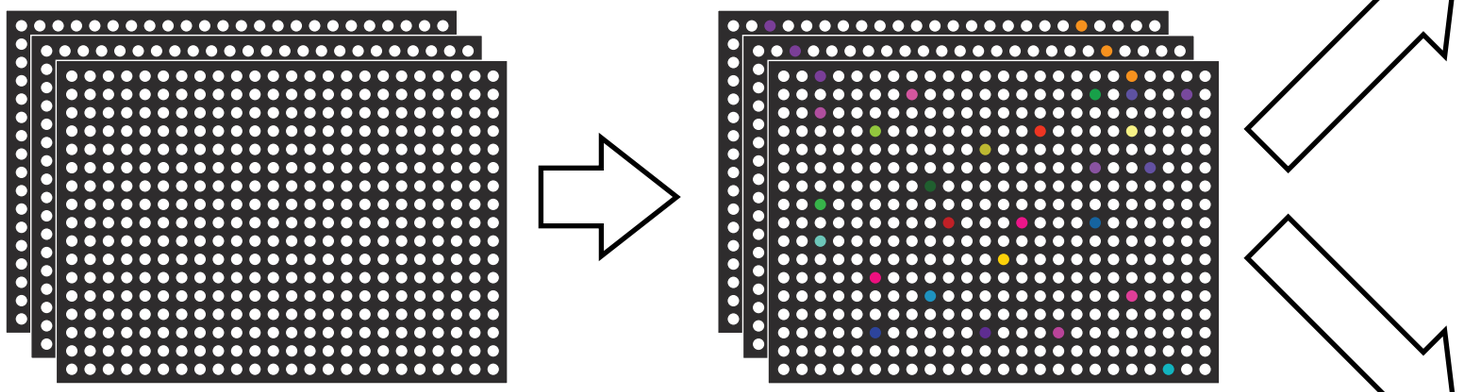
Intensity(reporter) based screen

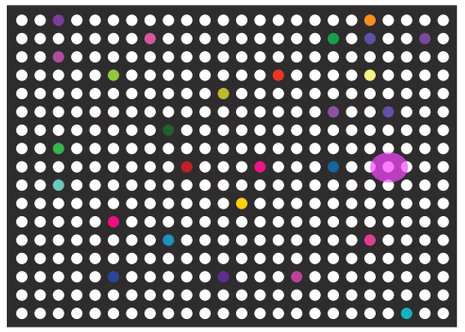
Plate reader (intensity readout)

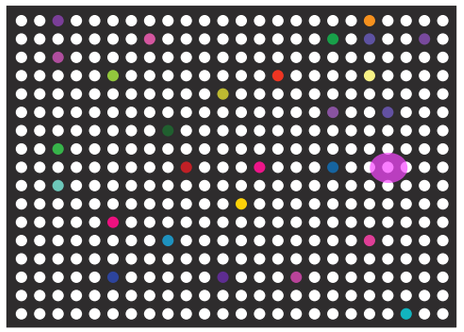
120

Cell seeding

Mini. reaction







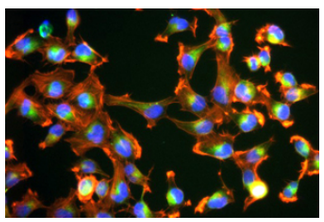


Image based screen

Microscope (image readout)

Hit Identification

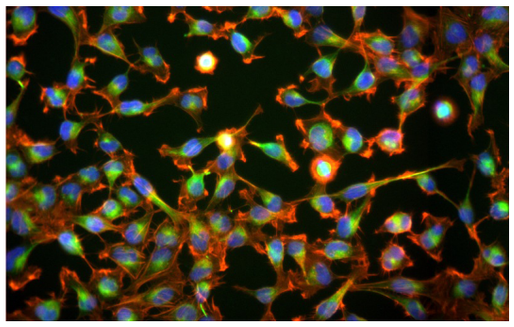
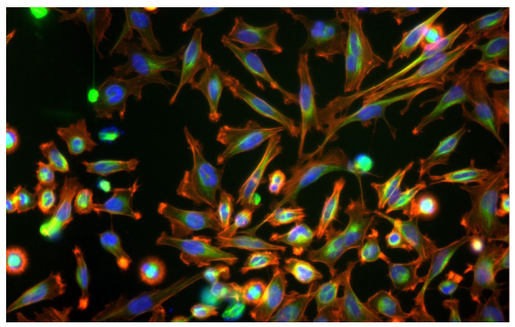
	Negative control	Sample	Difference
intensity screen	100	500	400
image screen			??

Image quantification

cell	features			
	size	shape	int.	...
1	50	0.3	650	...
2	64	0.8	800	...
...	...	...	...	...

cell	features			
	size	shape	int.	...
1	30	0.67	430	...
2	40	0.4	788	...
...	...	...	...	...

??

Dimension reduction

-	50	0.3	650	...

-	30	0.25	1200	...

Distance Calculation

Phenotypic distance

0.70

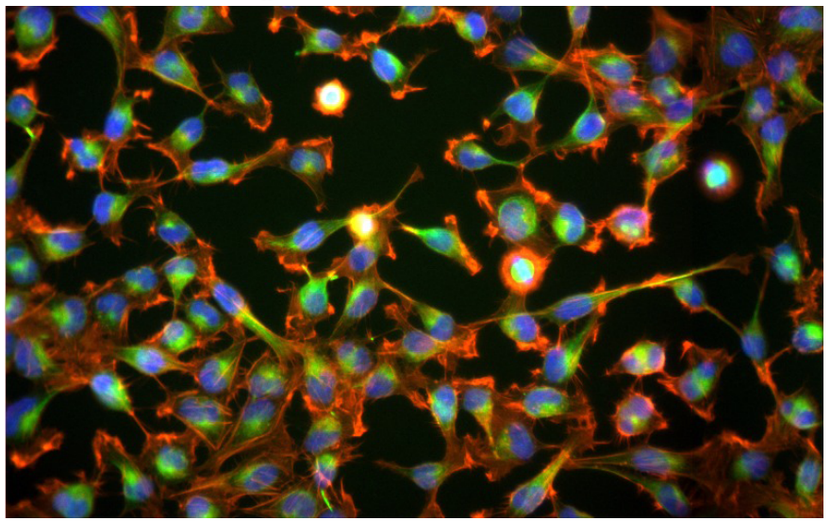
Phenotypic Distance Methods

Computation steps

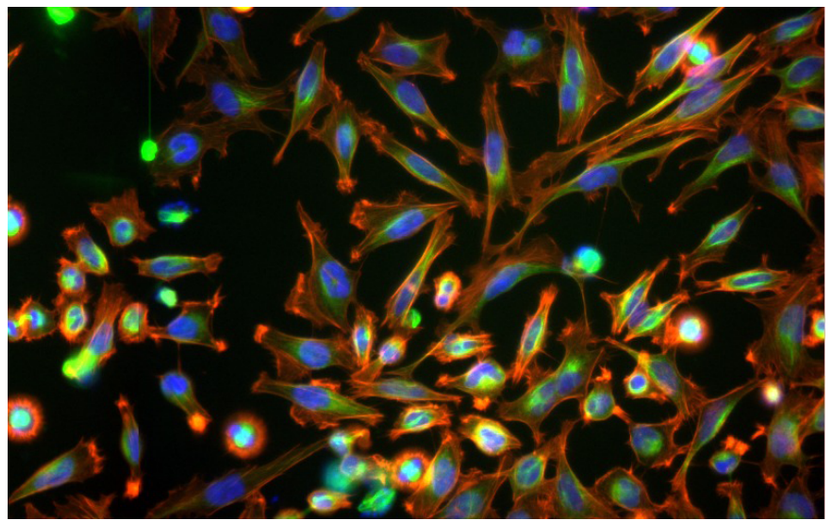
	Tanaka 2005	Young 2008	Perlman 2004	Fuchs 2010	Loo 2007
1. Feature selection					
2. Data Transformation	PCA	Factor analysis	KS statistic	Supervised classification	SVM weight vector
3. Distance calculation					

Phenotypic Distance via Classification

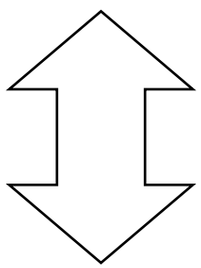
Negative control



Sample

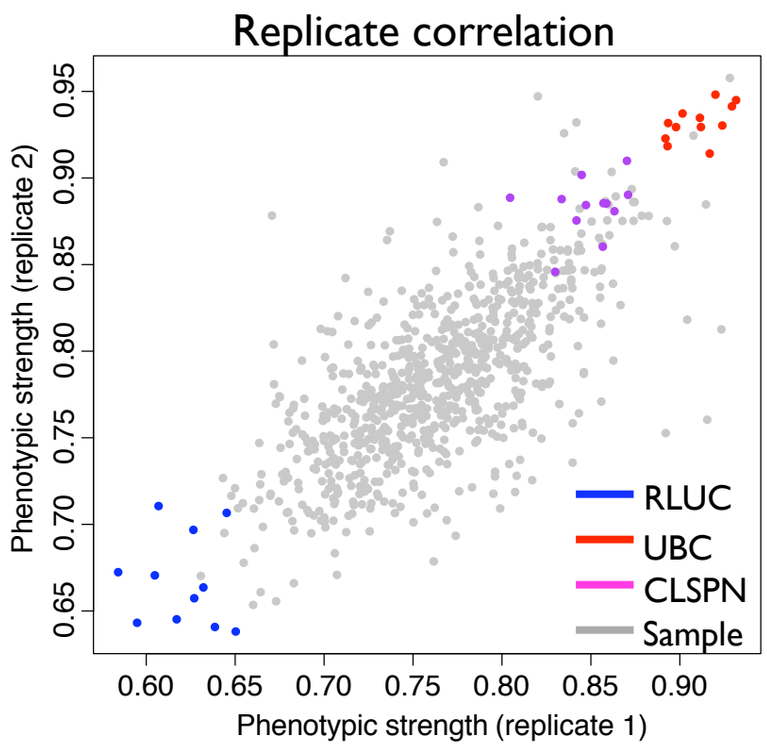


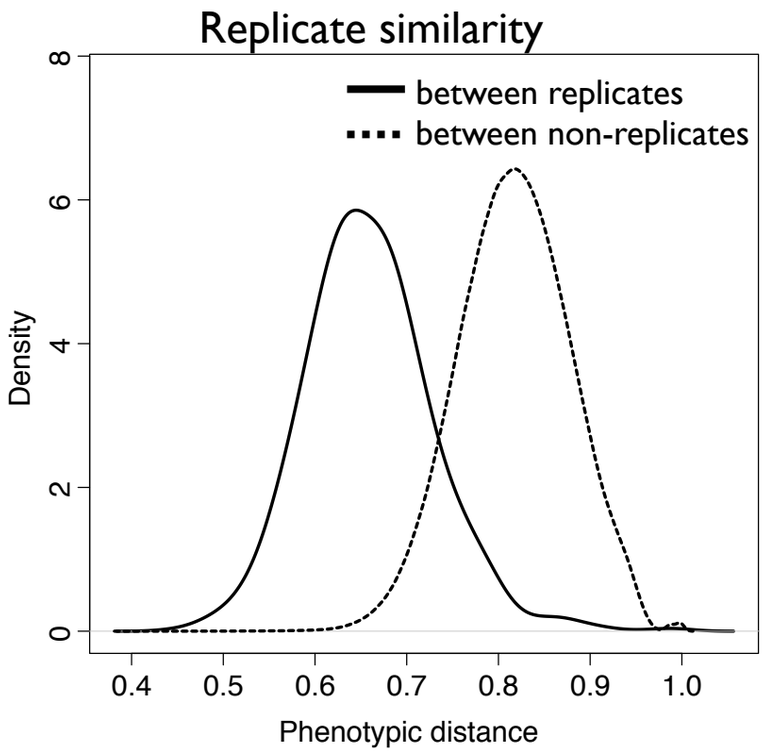
How similar/different are these two cell populations?

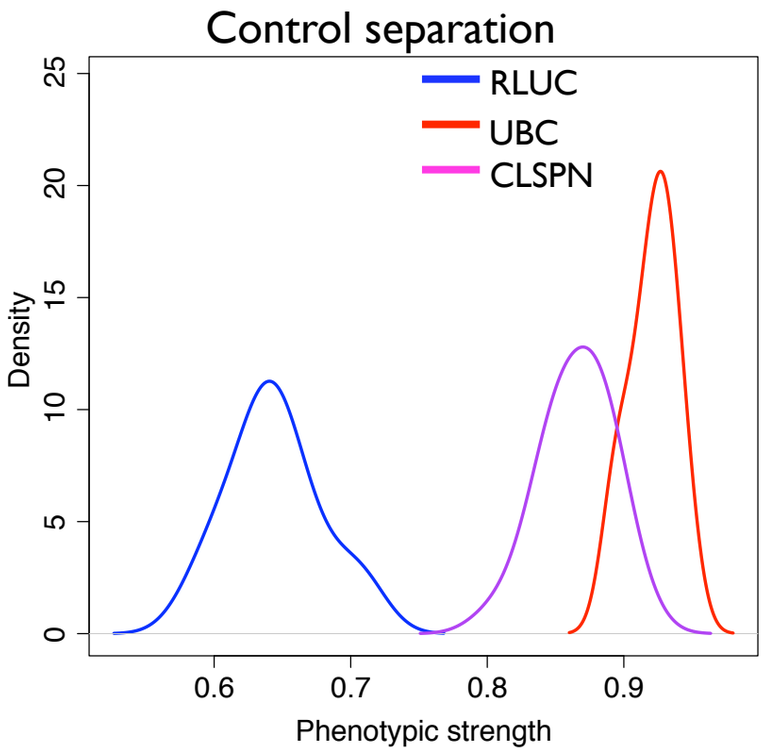


How easily can we separate the cell populations from each other, when they are mixed?

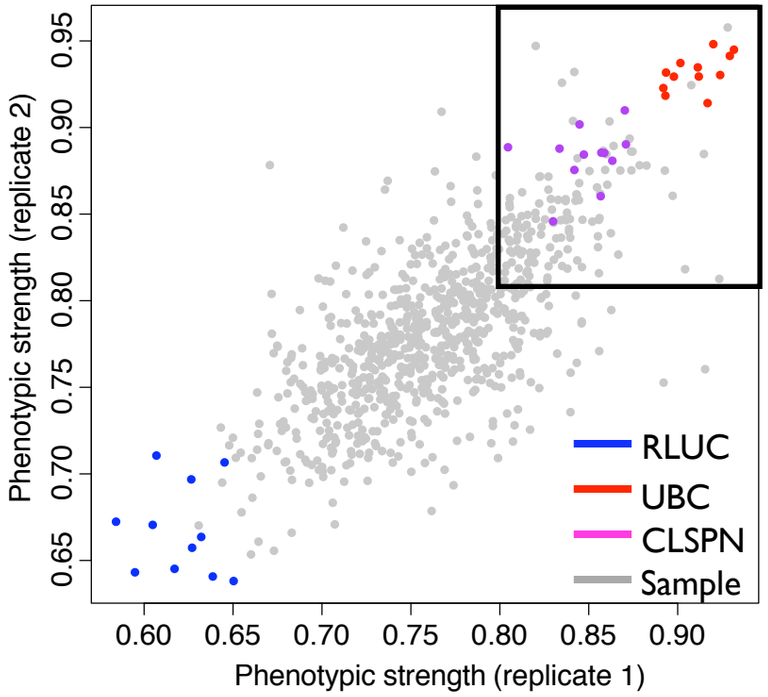
Quality Control

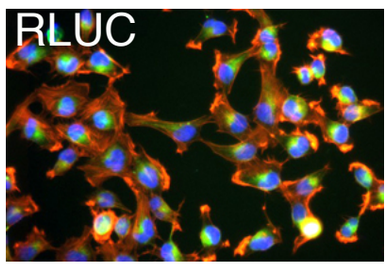


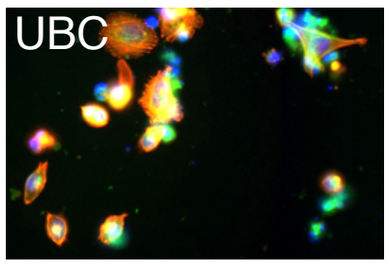


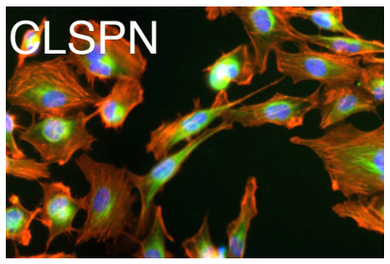


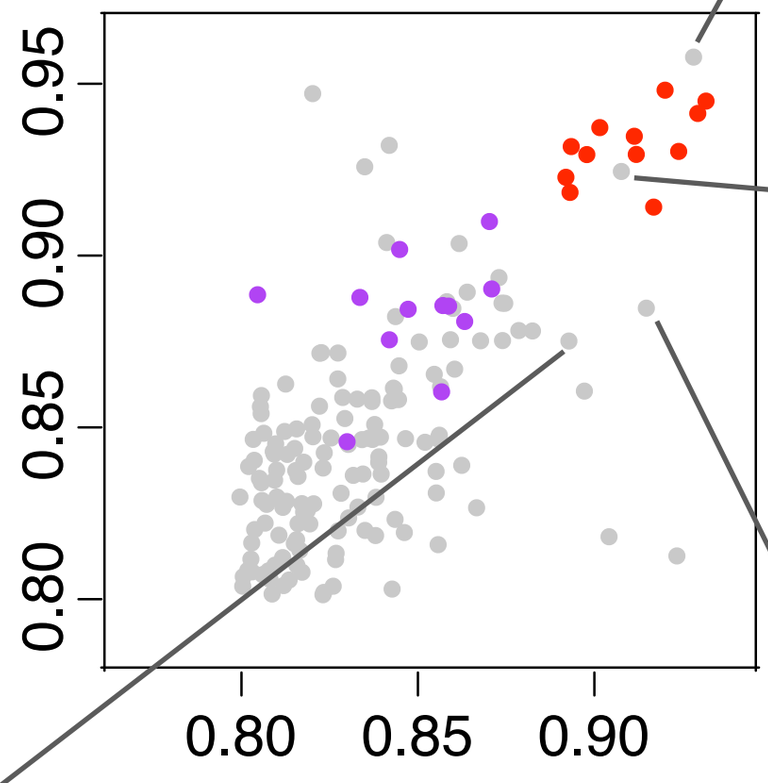
Hit Identification

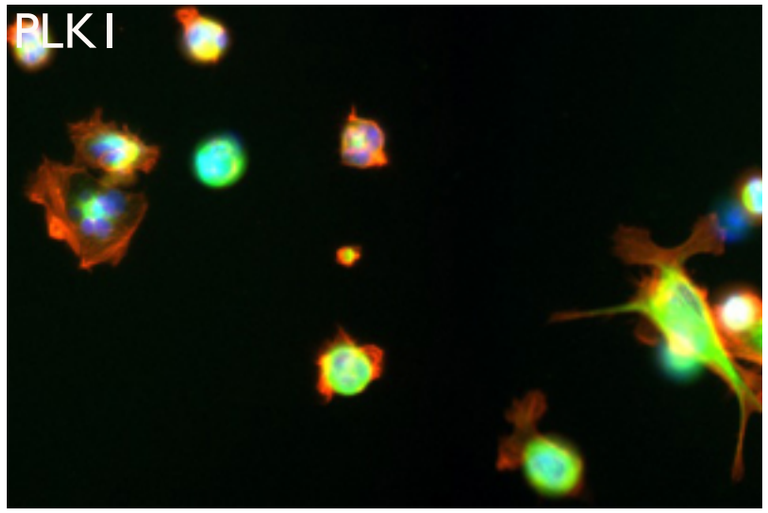


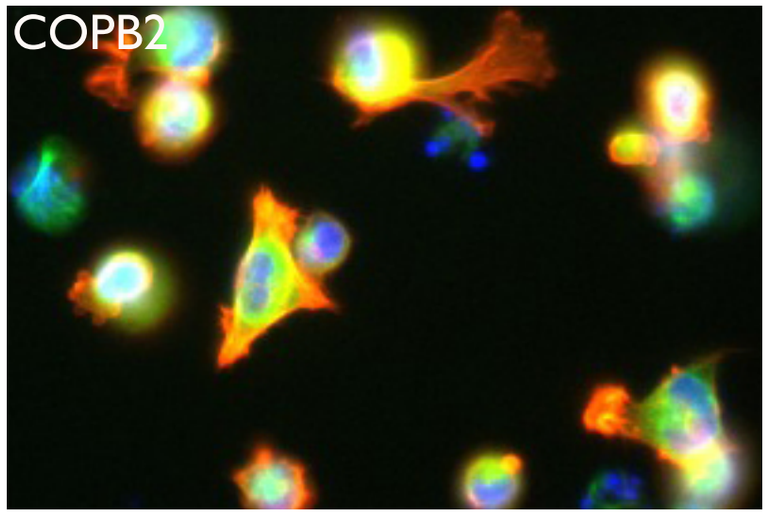


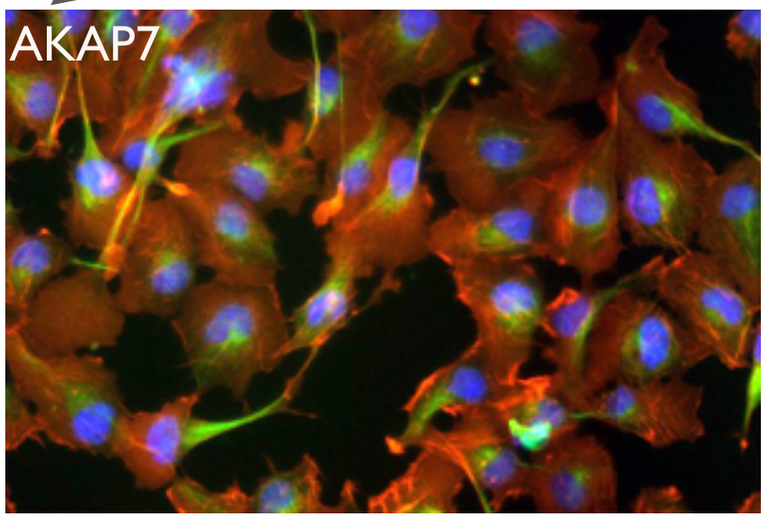


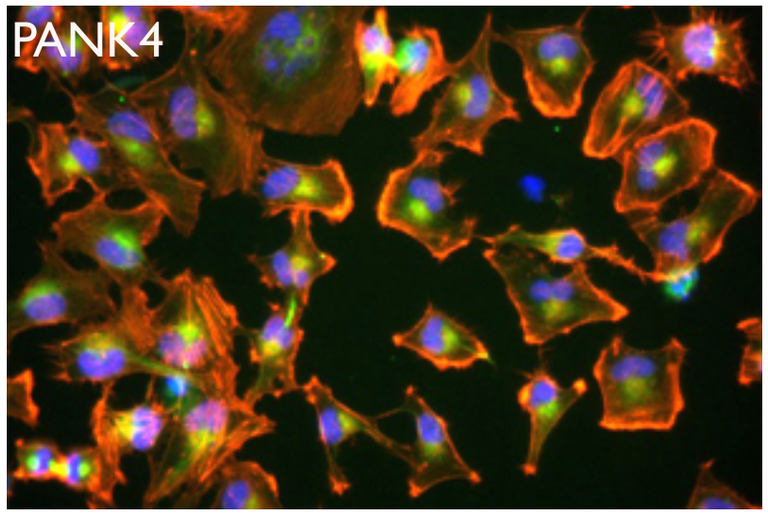




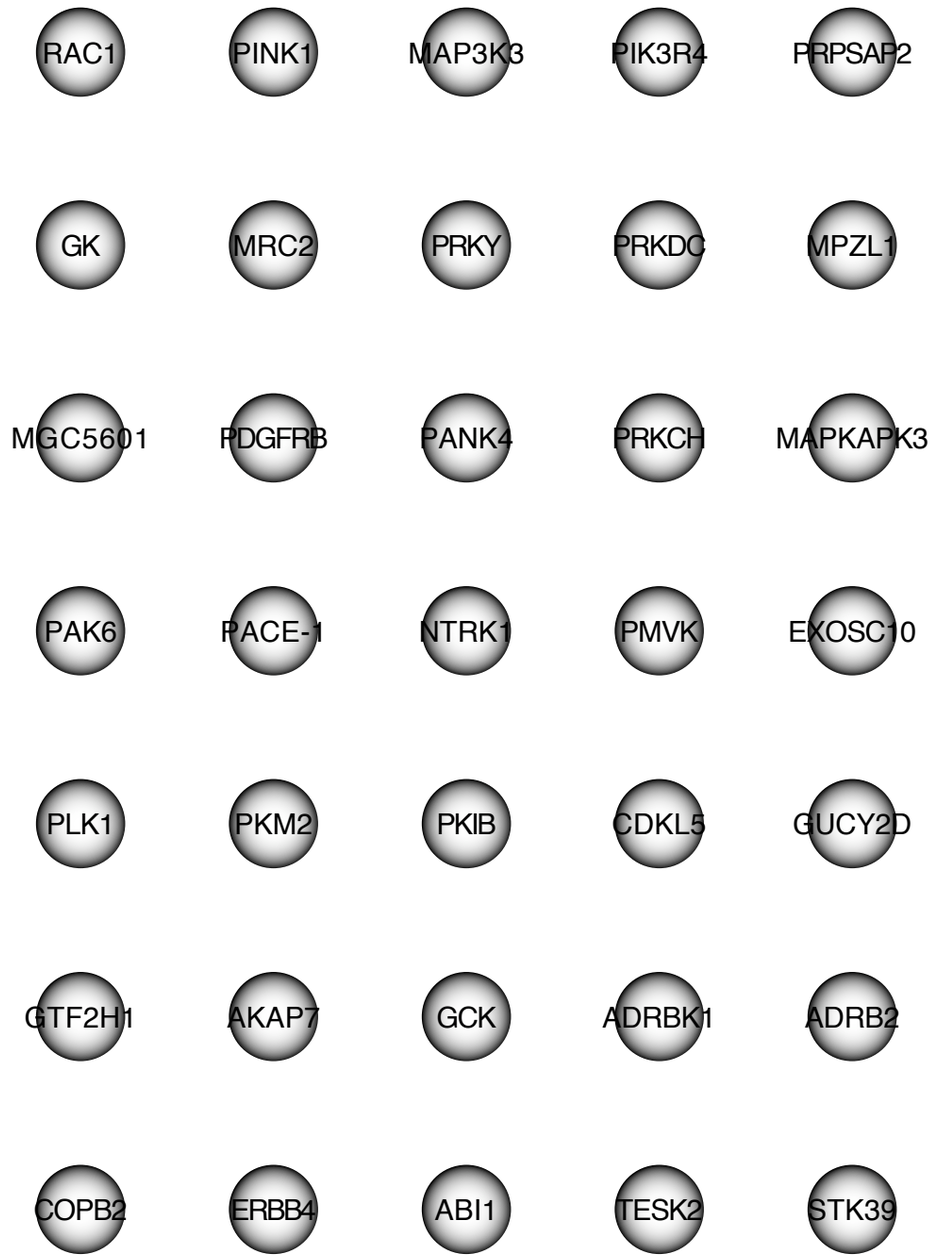




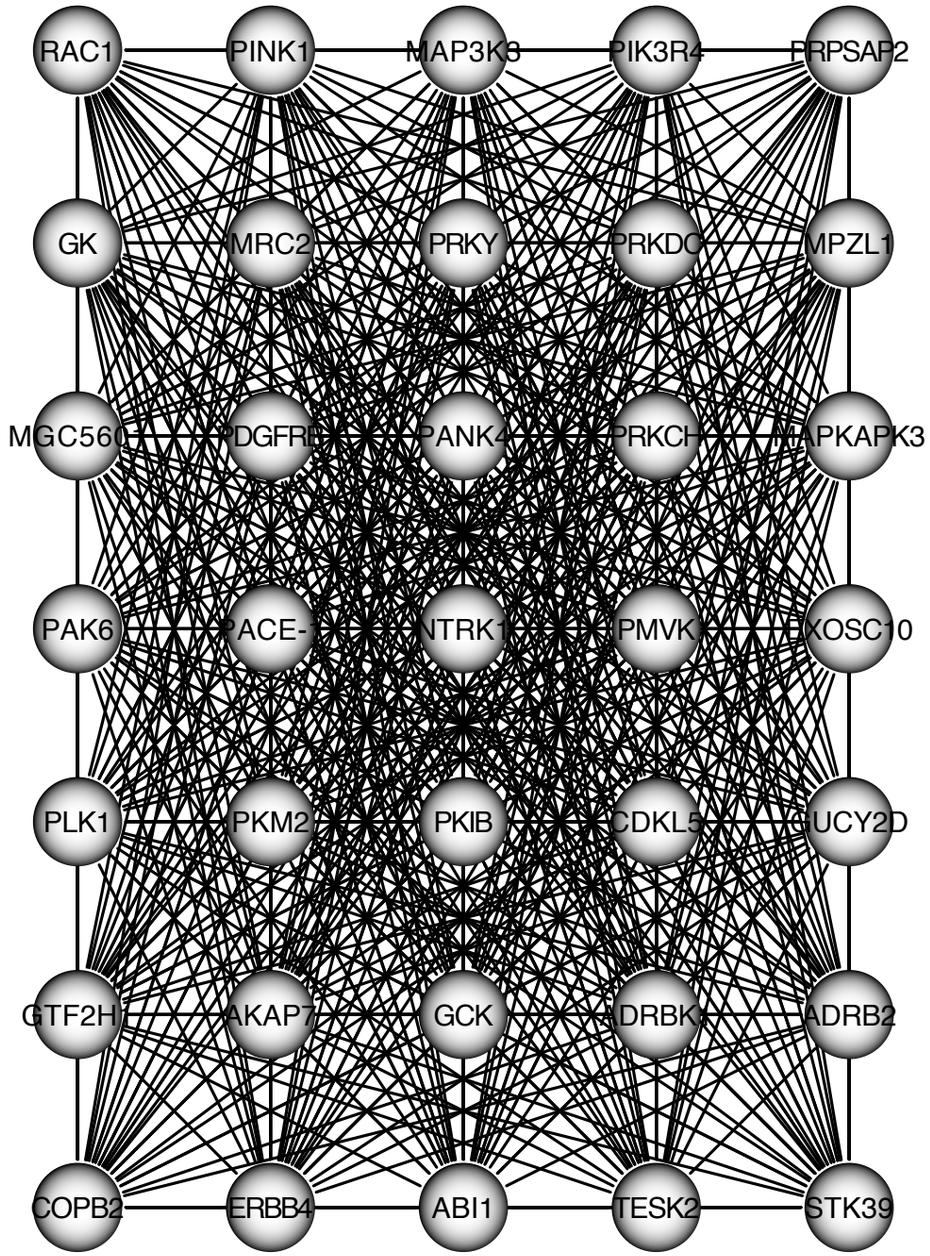




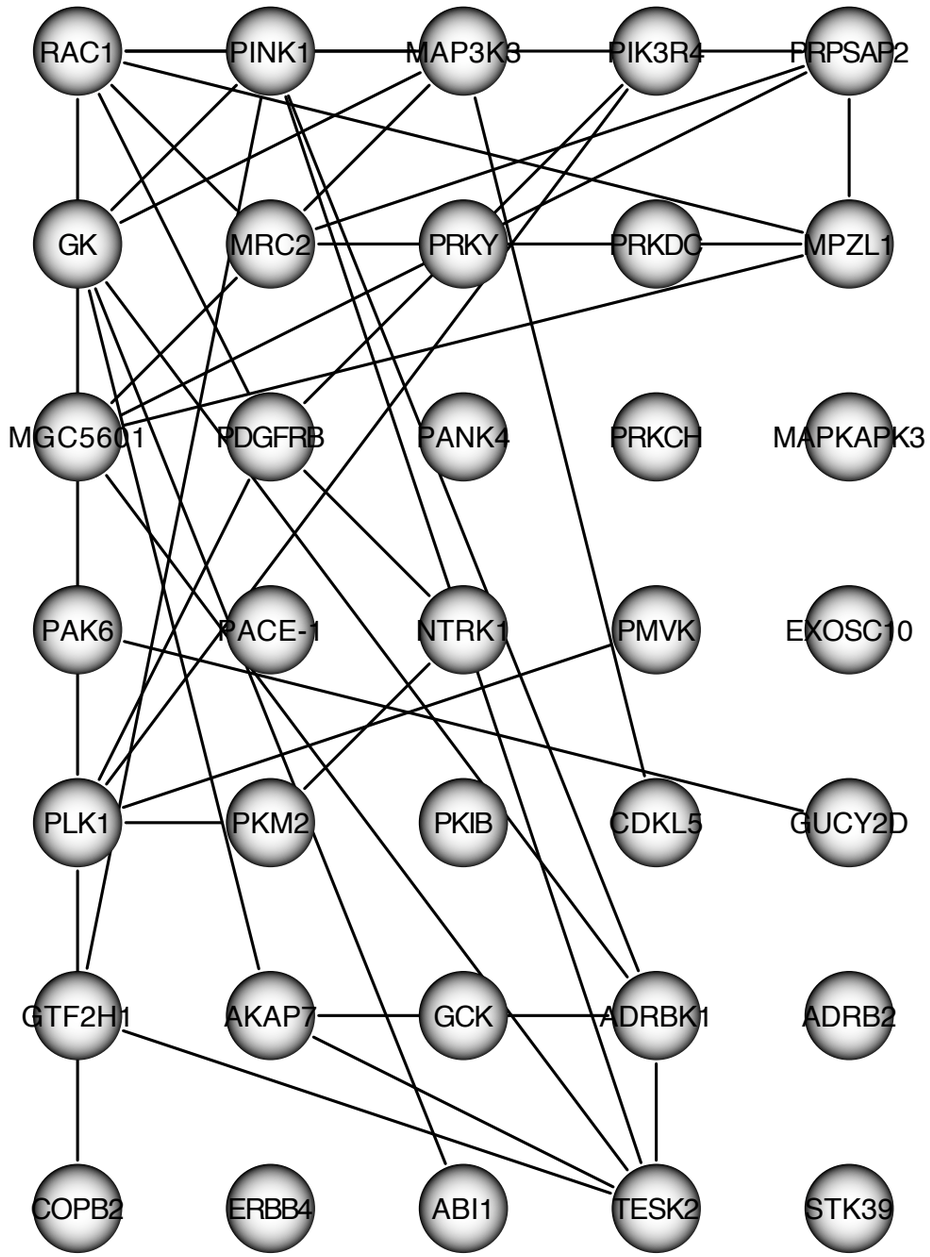
Hit Identification with Phenotypic Similarity



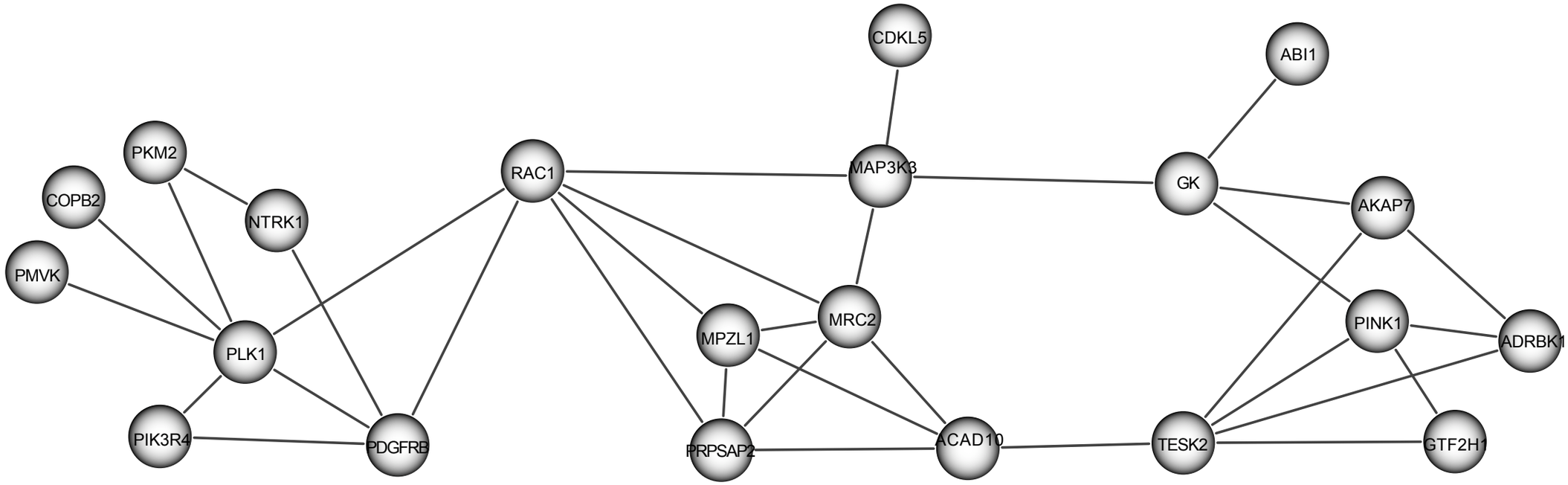
Hit Identification with Phenotypic Similarity



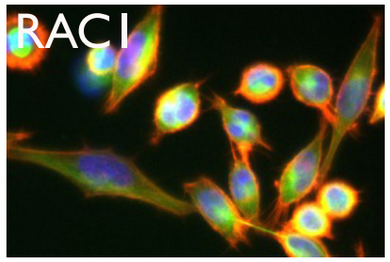
Hit Identification with Phenotypic Similarity

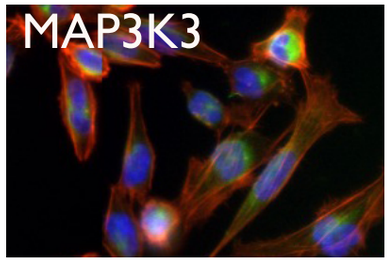


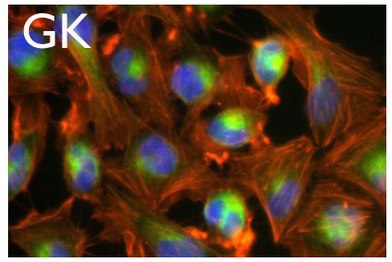
Hit Identification with Phenotypic Similarity

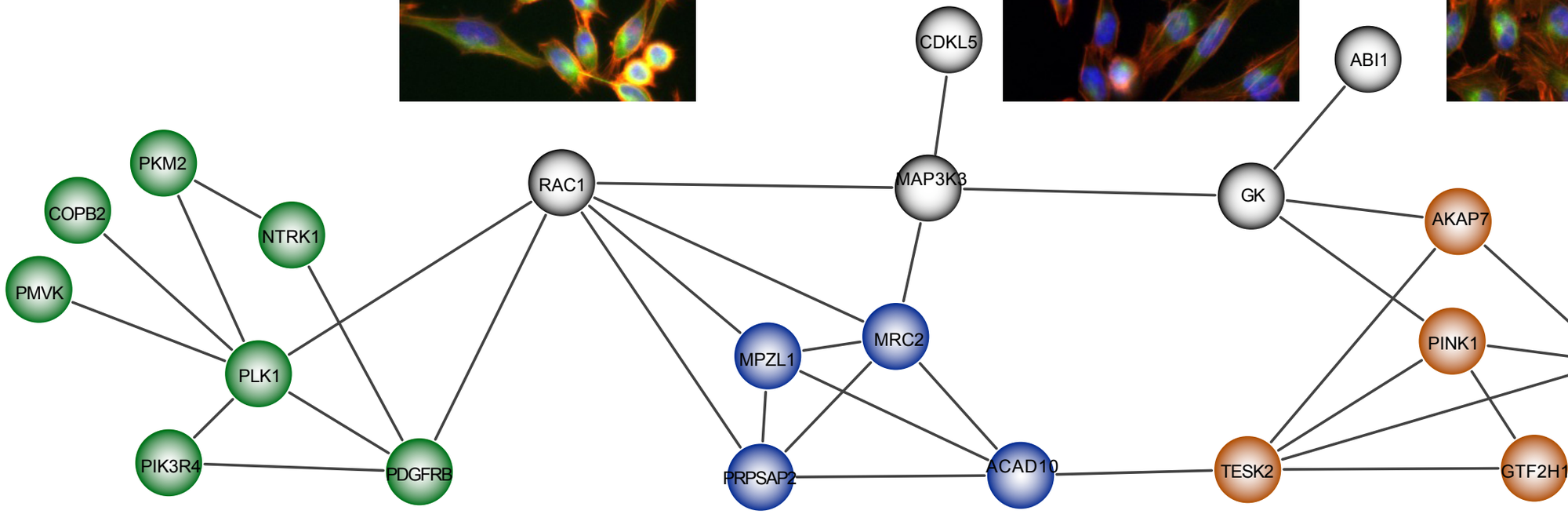


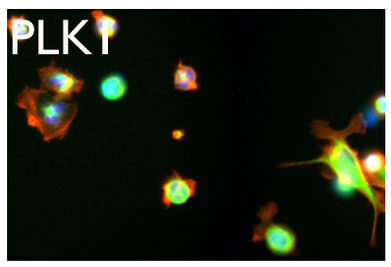
Hit Identification with Phenotypic Similarity

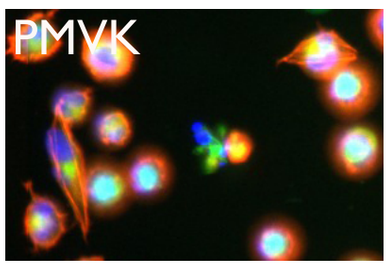


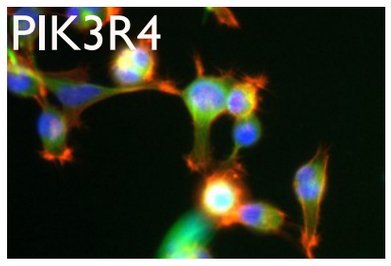


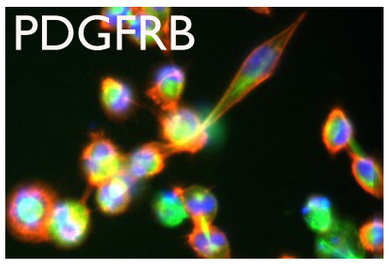


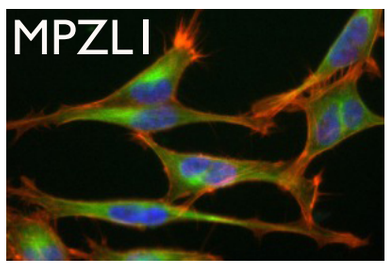


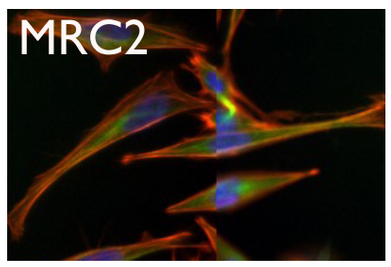


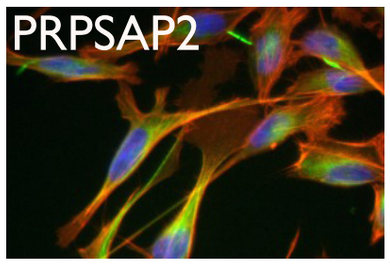


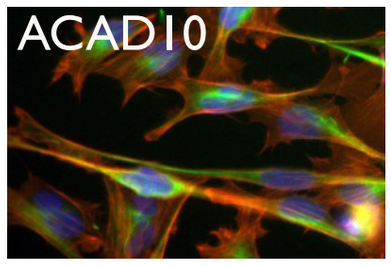


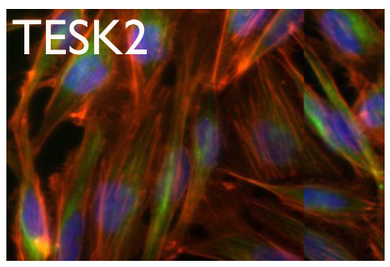


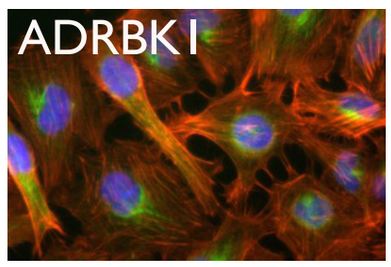


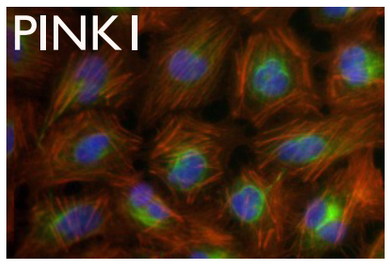


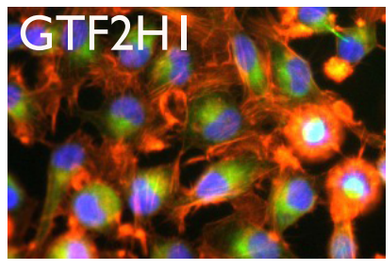








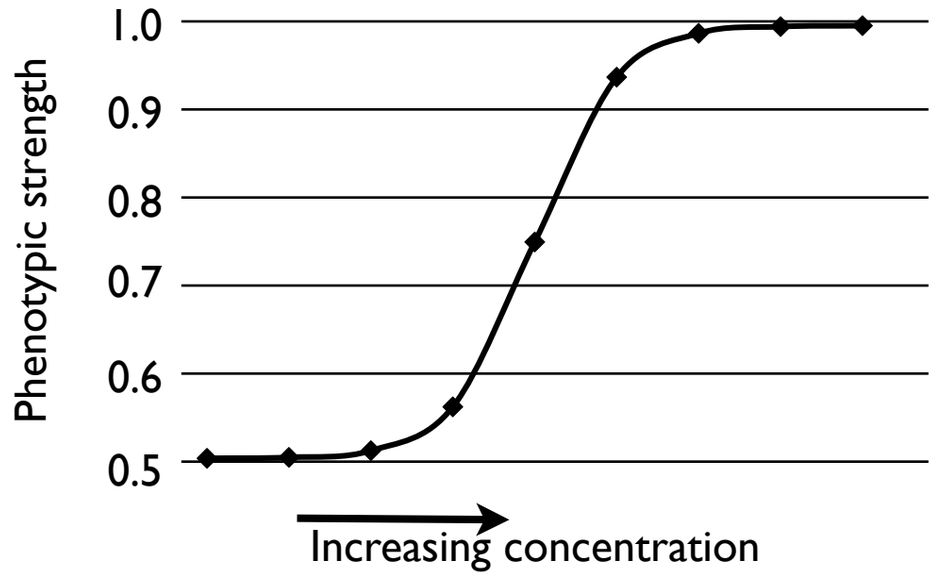




Future Development

Expand to compound screening analysis

e.g., dosage responsive curve, IC50 value



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